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AQUATIC NUISANCE CONTROL IN ONTARIO 1973

April, 1974

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AQUATIC NUISANCE CONTROL
IN ONTARIO - 1973

PESTICIDES CONTROL SECTION
POLLUTION CONTROL BRANCH
MINISTRY OF THE ENVIRONMENT

APRIL, 1974

INTRODUCTION

In an effort to control the addition of chemicals to water by the public for the control of aquatic nuisances, the Biology Section in close co-operation with the Ontario Ministry of Natural Resources has continued to scrutinize and licence pesticide applications through the Aquatic Nuisance Control Permit System. Under Section 38 of the OWR Act, permits are granted to individuals having an understanding of the advantages and disadvantages of chemical manipulation of the aquatic environment and who have carefully considered alternate methods of controlling the nuisance condition prior to initiating chemical treatment.

This report summarizes aquatic nuisance control activities for 1973 under the following headings:

- A. PERMITS ISSUED, outlines the distribution and types of treatments authorized.
- B. PUBLIC INQUIRIES AND PERMITS NOT ISSUED, indicates the volume of inquiries received from the public and provides an outline of the reasons behind permit refusals.
- C. POST TREATMENT SURVEY, outlines efficacy of 1973 treatment recommendations.
- D. CHEMICALS USED, summarizes compounds used, total quantity and acreage treated.
- E. EVALUATIONS, outlines experimental programmes undertaken in 1973 by Biology Section personnel.

PERMITS ISSUED

In 1973 a total of 150 permits were issued under Section 38 of the OWR Act authorizing the use of chemicals to control aquatic nuisances. This figure brings to 1,700 the total number of permits issued since legislation was enacted in 1962. Table 1 indicates permit distribution over this period.

Since more than one treatment may be incorporated in a single permit, the total number of chemical treatments is in excess of the total number of permits issued for the year. A breakdown of the 157 treatments authorized in 1973 is provided in Table 2.

Table 3 shows the numbers and types of permits issued for areas under the control of each district office of the Ministry of Natural Resources. The majority of permits were issued for treatments in the Lindsay and Maple Forest Districts and comprised 24.8% and 16.1% respectively of the total. Principal water bodies treated in the Lindsay district (and corresponding number of permits) were Buckhorn Lake (5), Canal Lake (2), Chemong Lake (3), Pigeon Lake (3), Stoney Lake (6), Sturgeon Lake (2) and the Trent Canal System (4). Primary areas treated in the Maple district were Georgian Bay (5) and a number of farm ponds (17).

A post treatment survey conducted late in the year by the Biology Section showed that 9 permit recipients ultimately decided against chemical treatments.

TABLE 1

ANNUAL PERMIT TOTAL SINCE INTRODUCTION OF THE SYSTEM

<u>YEAR</u>	<u>PERMIT TOTAL</u>
1962	140
1963	64
1964	53
1965	41
1966	110
1967	137
1968	185
1969	219
1970	182
1971	212
1972	207
1973	150
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TABLE 2

COMPOSITION OF 1973 APPROVED TREATMENTS

<u>Type of Control</u>	<u>Number of Treatments</u>	<u>Number of Permits</u>
Herbicides		
Algae	23	
Submerged aquatic weeds	102	126
Emergents	9	
Piscicides		
Ministry of Natural Resources	10	12
Other	2	
Larvicides		
Mosquito	4	
Black Fly	7	11
Molluscicide	0	0
Leechicide	0	0
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	157	*149

* Addition of one blanket permit to the Ministry of Natural Resources for treatments of less than 1 acre for fish eradication brings the total to 150.

Table 3

NUMBERS AND TYPES OF PERMITS IN EACH
MINISTRY OF NATURAL RESOURCES DISTRICT

Region	District	Herbicides			Biting Fly Larvicides		Piscicides	Total
		Algae	Submergents	Emergents	Black Fly	Mosquito		
1	Kenora		2					2
2	None							
3	Kapuskasing						2	2
	Cochrane				1			1
	Timmins						3	3
4	Blind River				1			1
	North Bay						1	1
5	Parry Sound	1			2	1	2	6
	Pembroke			1	2			3
	Bracebridge	1	2	2				5
	Minden		5	1				6
6	Ottawa					1		1
	Cornwall		1					1
	Lanark		3	1			1	5
	Brockville	1	4	1				6
	Tweed	1	6	1				8
	Napanee		6					6
7	Huron	1	8					9
	Lindsay	1	35		1			37
	Maple	8	13	1		1	1	24
	Cambridge	3	3	1			1	8
8	Owen Sound	5	2					7
	Wingham		1	1				2
	Aylmer	1				1		2
	Simcoe		1				1	2
	Chatham		1					1
		23	93	10	7	4	12	149*

* The addition of one blanket permit to the Ministry of Natural Resources for treatments of less than 1 acre for fish eradication brings the total to 150.

PUBLIC INQUIRIES AND PERMITS NOT ISSUED

In 1973, The Biology Section at Rexdale, Ontario, answered approximately 1000 inquiries concerning aquatic nuisances and their control; a slight decrease over 1972. A breakdown of these inquiries is as follows:

<u>Subject</u>	<u>Percent of Total Inquiries</u>
Algae and aquatic vegetation control	31
Ponds-water, weed and fish management	14
Black Fly and Mosquito control	9
Leech control	3
Piscicides	2
Swimmer's Itch control	1
Miscellaneous - educational inquiries, etc.	40

In the case of 16 inquiries, advice was given discouraging the use of chemicals as a remedial measure. In some cases it was felt that chemical treatment would simply replace one problem with another, while in others the problems were so minor that chemical use was unwarranted. In addition, 10 treatments were refused because the applications were received too late in the year for satisfactory treatment results, and 6 were refused because control could not be achieved by chemicals under the specified conditions. Seventeen applicants failed to answer correspondence requesting additional information.

POST - TREATMENT SURVEY

Of the 150 permits issued in 1973, 126 were issued for the use of aquatic herbicides. To assess the effectiveness of recommended herbicide applications, a post-treatment questionnaire was circulated to the permittees. Sixty-eight completed forms (54%) were returned by the year's end (December 10, 1973). Results of the survey are tabulated in Table 4. Since the number of replies in each category are proportional to the permits issued, the returns may accurately reflect the results achieved through chemical treatments in 1973.

TABLE 4

POST-TREATMENT SURVEY 1973

	Number of Replies (68)	% of those responding	% of Total Herbicide Permits (126)
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Type of Treatment			
Algae	15	22.1	16.6 (21)
Submergents	51	75.0	80.2 (101)
Emergents	2	2.9	3.2 (4)
Type of Treatment Area			
Pond, Reservoir	20	29.4	26.9 (34)
Lake, Bay	39	57.4	57.3 (72)
River, Canal	9	13.2	15.8 (20)
Subjective Interpretation of Results of Treatment			
Excellent	21	30.9	
Good	24	35.3	
Satisfactory	8	11.8	
Fair	11	16.1	
Poor	4	5.9	
Number of applicants who obtained a permit prior to 1973	42	61.8	
Number of applicants new in 1972	26	38.2	
Number of applicants wishing renewals for 1974	61	89.7	
Number of applicants not wishing renewals	7	10.3	
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Results of treatments, as judged by the permittees themselves, were generally good to excellent. Less successful results may be attributed to the difficulty in curtailing development of filamentous algae which was quite prolific in some situations. Other factors such as presence of resistant species of vegetation and inappropriate time of application may have influenced the results achieved.

The questionnaire brought to light two additional points of interest:

- A. 9 permits (3 algicide and 6 herbicide) which had been approved and issued were not undertaken.
- B. Only two minor violations were observed when the issued permit was compared to the questionnaire. In one case this involved application of chemical outside the stipulated time interval and in the other, application of the wrong quantity of chemical. Follow-up letters have been mailed to these individuals pointing out their non-compliance and cautioning them with respect to future infractions.

Owing to the valuable information gained through return of the questionnaires, it is the intention of staff to continue this post-treatment survey procedure.

CHEMICALS USED

The total quantity of chemicals used and acreages treated in 1973 are indicated in Table 5.

Herbicides

As outlined in the Ontario Ministry of Agriculture and Food Publication 75, the 1973 aquatic herbicide recommendations included copper sulphate or Cutrine (algae); simazine or diuron (algae and submergents); diquat (submergents); 2,4-D iso-octyl ester (water lilies); dalapon, amitrole, paraquat or 2,4-D amine (emergents); and 2,4-D ester or 2,4-D amine (water milfoil only).

Table 5

QUANTITY OF CHEMICAL USED AND ACREAGES TREATED 1973

	% Active ingredient	Quantity product used	Number of Treatments	Area treated (acres)
<u>Algicides</u>				
Copper Sulphate	100	569 lbs.	14	25.8
Diuron (Karmex)	80	9 lbs.	2	0.9
Simazine (Princep)	80	173 lbs.	7	5.2
<u>Herbicides</u>				
2,4-D granular (Aqua Kleen)	20	425 lbs.	5	4
2,4-D granular (Crop Rider)	20	75 lbs.	1	0.5
Diquat (Reglone 'A')	20	476 Imp. Gal.	95	240
Gramoxone (Paraquat)	20	4.25 Imp. Gal.	3	4.25
2,4-D low volatile iso-octyl ester	50	2.1 Imp. Gal.	5	3
<u>Piscicides</u>				
Pro-Noxfish	5	648 Imp. Gal.	9	155.5
Warbicide 5 (rotenone)	5	408 lbs.	3	24.8
<u>Biting Fly Larvicides</u>				
Abate 2G	2	Unknown	1	Unknown
Abate 4E	43	Unknown	5	Unknown
Abate 5C	.26 gm/cap	273 capsules	3	8 acres
Methoxychlor (Marlate 2 MR)	24	Unknown	2	Unknown

As in previous years, diquat (Reglone 'A') was the most commonly used herbicide for the control of submerged aquatic weeds which constituted the major nuisance problem in the province. 95 of the 101 (94.1%) submergent vegetation control permits authorized the use of this chemical.

Larvicides

Black fly and mosquito larviciding accounted for less than 8% of the permitted treatments. A breakdown of the 11 permits issued is shown in Table 6.

Piscicides

Twelve permits were issued authorizing fish control activities, 10 permits to the Ministry of Natural Resources and 2 to private pond owners and associations. Rotenone was the fish toxicant used in all operations, either as Pro-Noxfish or Warbicide 5. The use of 648 gallons of Pro-Noxfish was authorized (in 9 permits) to treat 3075.5 acre-feet of water and 408 lbs. of Warbicide 5 was authorized (in 3 permits) in treatment of 188 acre-feet. Also, a blanket permit was issued to the Ministry of Natural Resources for treatment of areas less than 1 acre in size to facilitate spot sampling of fish populations and small reclamation projects.

EVALUATIONS

Cutrine granular (a copper triethanolamine complex) was applied to a small on-stream pond at a rate of 250 pounds product per surface acre, July 27. Bottom production of filamentous green algae (Mougeotia sp. Spirogyra sp. and Cladophora sp.) was significantly reduced and floating mats eliminated within three days. By the sixth day floating mats again covered a substantial surface area probably due to rapid pond turnover and optimum weather conditions.

A triazine mixture by CIBA-Geigy (A-3777) was tested in several different situations for efficacy against a variety of filamentous algae and macrophyte species. Promising data from the static water tests has led to a decision that further research will be undertaken next spring.

Table 6

LARVICIDE PERMITS 1973

Purpose of Treatment	Number of Permits	Applicant	Chemical
Black Fly Larvae Control	2	Ontario Hydro	Methoxychlor
	1	Research	Methoxychlor
	3	Tourist areas	Abate 4E
	1	Private	Abate 4E
Mosquito	1	Municipality	Abate 2G
Larvae Control	3	Private	Abate 5C

Larvicidal materials for both mosquitoes and black flies were applied at specified recommended rates to infested areas located within the approved treatment period. The total quantity of chemical was calculated on the site to incorporate important variables: exact stream velocity in the case of black fly larviciding, and exact area of infested standing water in the case of mosquito larviciding.

Tests were also undertaken with personnel from Niagara Chemicals (FMC) to evaluate Aquashade, a turquoise blue dye which is designed to control aquatic vegetation by increasing water opacity. Lateness of the season produced inconclusive results, but further tests will be undertaken in 1974.

Mechanical removal of unwanted aquatic plants through cutting, pulling, dredging, raking, etc. has often been advocated as an alternate control method. To assess the ecological impact of a weed harvesting programme, the Ministry has recently initiated a comprehensive study in Lower Chemung Lake which focuses on the problem of water enrichment and associated high-level plant production and the resulting impact on water use potential. Plant-fish relationships and the significance of nutrient reduction through repetitive cutting and removal of vegetation are under intensive investigation. Preliminary results are expected to be available following the 1974 field season.

DISCUSSION

In comparison with previous years, there was a reduction in the number of inquiries handled and permits issued in 1973. Numerous information kits are now distributed from regional offices of the Ministry of the Environment as well as the Ministry of Natural Resources and therefore inquiries handled by the Ministry of the Environment, Rexdale office, are not a true indication of public concern over aquatic nuisance problems. The decline in permits issued may be significant, particularly for herbiciding operations, although the quantity of herbicides used in 1973 throughout the province declined only slightly. This may be due in part to public dissatisfaction with the degree of control achieved in specific problem areas. Some possible problem areas are listed below in order of diminishing importance:

1. Control of submerged plants in many recreational areas where a number of previous herbicide treatments have facilitated a change in plant community dominance to the resistant species Vallisneria americana (tape grass).

2. Control of filamentous green algae in flow-through ponds where continual reinfestation may reduce the duration of algicidal control to only a few days.
3. Suitability of aquatic weed control in areas where a cussession of submerged plant communities reduces the duration of efficacy of a product (applied optimally in the late spring) to less than a full season's control.
4. Control of the plant-like algae Chara sp., in trout ponds where sufficient contact time cannot be maintained.

This report was prepared by Miss D.L. MacKenzie formerly of the Biology Section, Water Quality Branch. The responsibility for administration of aquatic nuisance control programs has been transferred to the Pesticides Control Section, 1 St. Clair Avenue West, Toronto, Ontario. Further information in this regard may be obtained by contacting this office at 965-2401 (Area Code 416).



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